Blood Product Research - An Update
SAFMLS 2002

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WRAIR

MARCH 2001

BLOOD RESEARCH DETACHMENT

TRANSFUSION MEDICINE AND HEMOSTASIS

DEPARTMENT OF BLOOD RESEARCH

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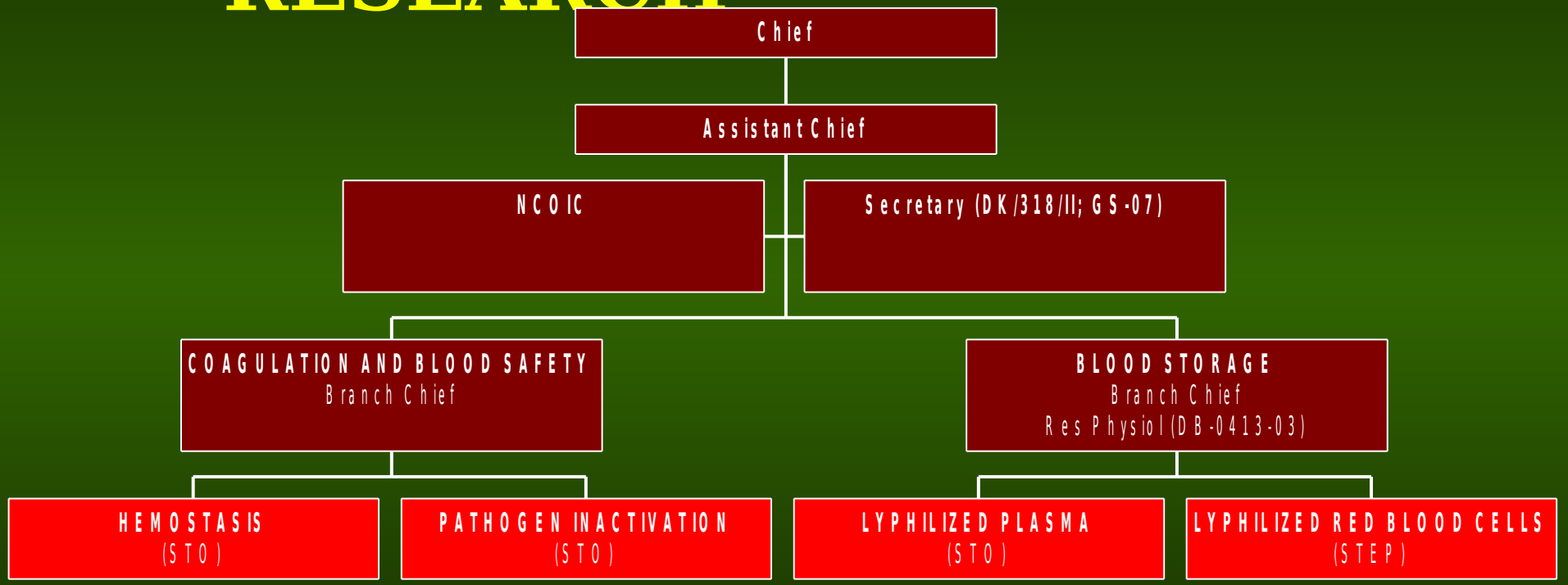
DEPARTMENT OF BLOOD RESEARCH



MISSION

- Develop novel hemostatic treatments.
- Develop novel and safe formulations of resuscitation fluids and blood products for transfusion.
- Understand the blood clotting system in trauma and infection.

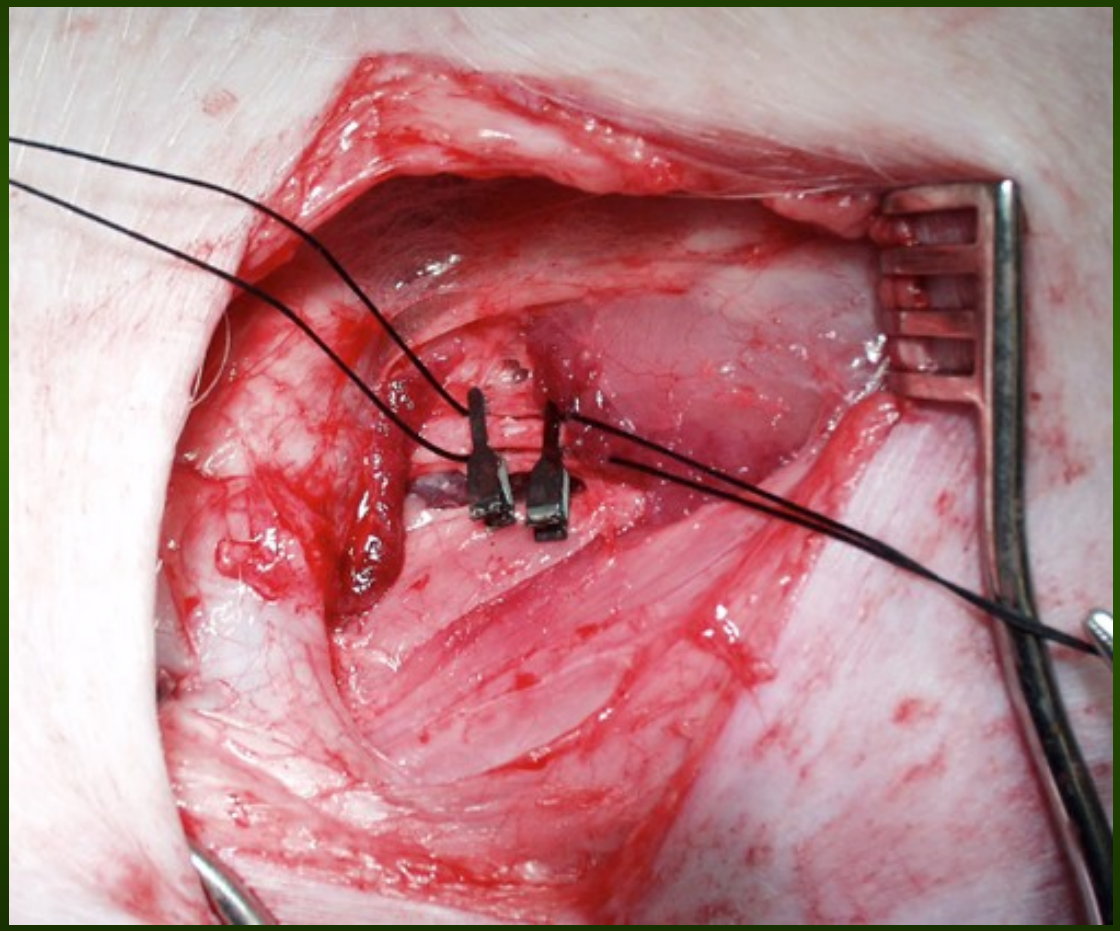
GOALS

- Enhance far forward medical capability.
- Decrease the number of soldiers KIA due to hemorrhage.
- Reduce the logistical footprint.

HEMOSTASIS

- **Hemostatic bandages**
  - **“human fibrin” dressing – femoral artery model**
  - **“fibrin” dressing using salmon fibrinogen**
  - **Genetically engineered proteins**
  - **TachoComb bandage**
- **Infusional therapies - Recombinant factor VIIa**

FEMORAL ARTERY MODEL



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CLOT FORMATION

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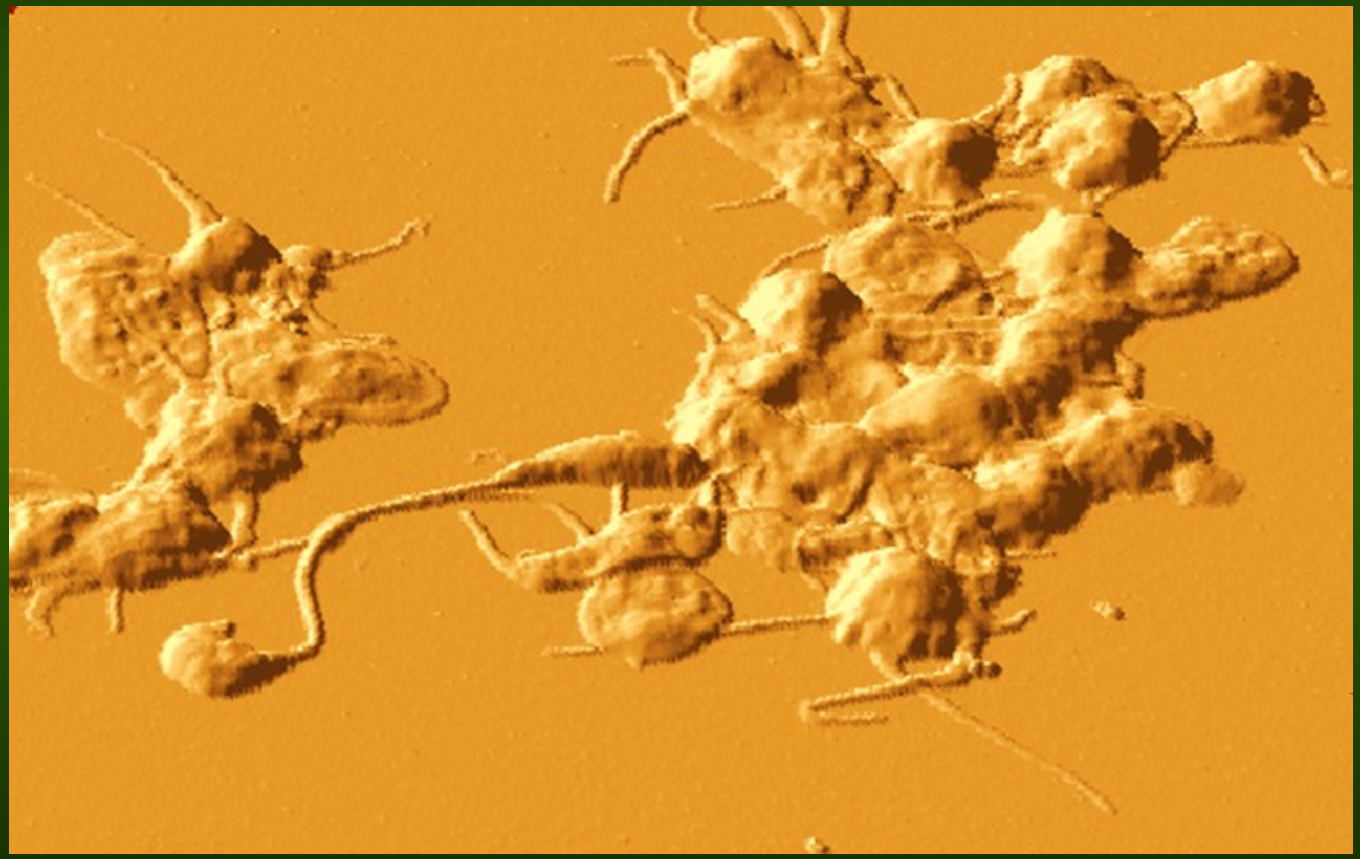
PLATELETS

- Liquid preservation: 4°C with DMSO ± Thrombosol
- Frozen platelets
- Freeze-dried platelets
  - DMSO: not yet approved by FDA
- CYPLEX™: infusional platelet microparticles (IPM)

PLATELET AGGREGATES



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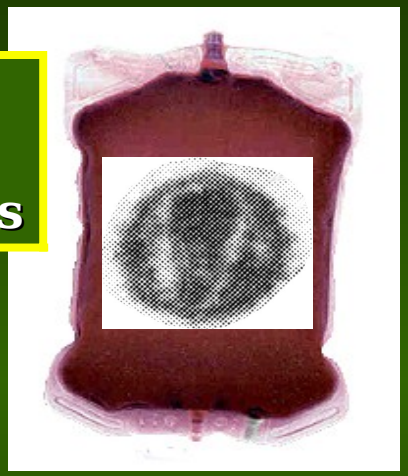
PATHOGEN INACTIVATION TECHNOLOGIES

Whole Blood or Red Blood Cells



Inactines, FRALE, Riboflavin, I_3^- based

Plasma or Platelets

S59/UV, Inactines, FRALE, Riboflavin, I_3^- based

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LYOPHILIZED PLASMA

- Lyophilized Plasma
  - optimization of conditions
  - development of bag for freeze-drying
  - shelf life determination through rapid aging
- Extended storage after thawing

LYOPHILIZED PLASMA

Frozen Plasma

Freeze-dried Plasma

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LYOPHILIZED SD PLASMA

LYOPHILIZED SD PLASMA NEW 50 ML BAG

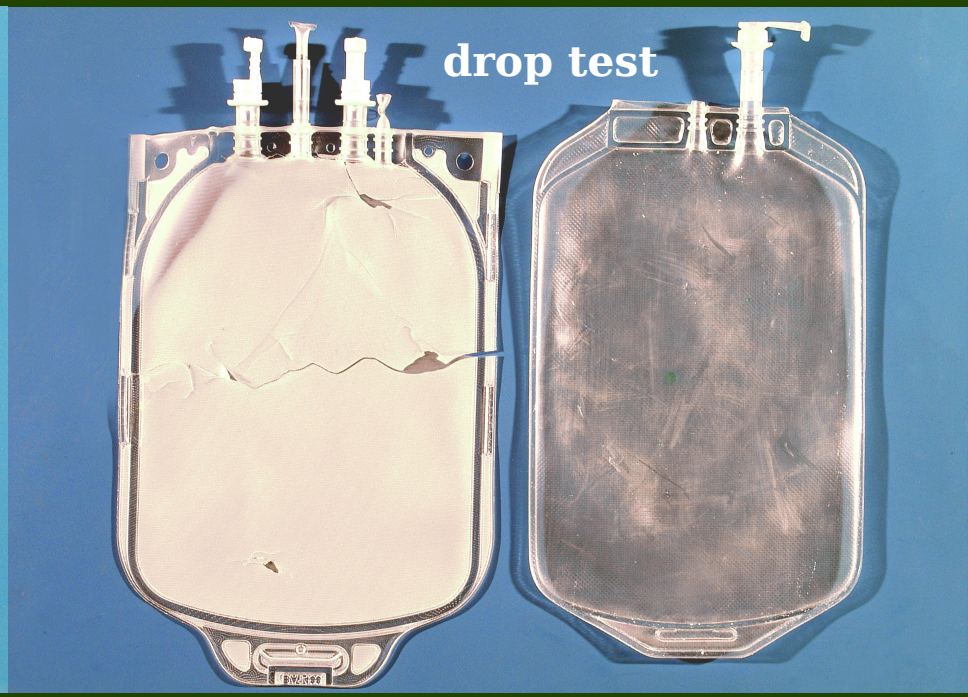
14 Mar 02

15 Mar 02

RED BLOOD CELLS

- Ideal Bags for Frozen Blood Products
- Liquid preservation at 4°C for 10 weeks
- Frozen Red Blood Cells
  - Haemonetics 215
  - Mission Medical
- Freeze-dried Red Blood Cells
  - Canine red blood cells

Comparison of PVC+DEHP and EVA: Impact and Drop Testing



PVC + DEHP **EVA** **PVC + DEHP** **EVA**

PVC= poly(vinyl chloride), **DEHP**=diethylhexylphthalate, **EVA**=poly(ethylene

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STATUS OF
"BLOOD SUBSTITUTES"

- **BAXTER** (HemAssist™; 2nd generation): in preclinical development
- **BIOPURE** (Hemopure®): Approved in South Africa, Phase II, Phase III clinical trials, BAMC; expected to submit BLA soon
- **HEMOSOL** (Hemolink®): Phase II and III clinical trials
- **NORTHFIELD** (PolyHeme™): Phase II and III clinical trials, WHAFMC, TAMC; submitted BLA 2001
- **SYNZYME** (Hemozyme™): preclinical
- **ALLIANCE PHARMACEUTICALS** (Oxygent™): Phase II and III clinical trials
- **SYNTHETIC BLOOD INTERNATIONAL** (Oxycyte™): Phase II and III clinical trials

MEMBRANE STUDIES

- NMR to investigate Model Membranes
- What happens to membranes as we cool them?
- What is the effect of DMSO on the membrane?

STEM CELLS

Blood cells from stem cells:

The future of transfusion medicine?

BLOOD BANK FELLOWS

- **LAST CLASS**
  - Inactivation of malaria-riboflavin
  - Coags. in outdated plasma
  - DMSO plts stored at 4ºC
  - Extension of RBC storage after deglycerolization
- **THIS CLASS**
  - Freezing bag study
  - Expression of cytokines on stored cells

Questions?